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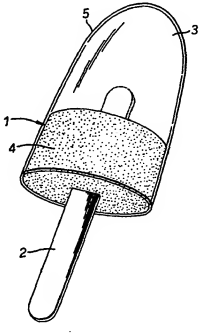

(57) Abstract

An edible article, e.g. an ice lolly (1) having a temperature below -3 °C, at least part (3) of which is transparent and in a non-crystalline state. In preferred embodiments that part (3) is either in a non-solidified state at temperatures down to at least -5 °C or in a glassy state at temperatures between -5 °C and -20 °C.

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CONFECTION

The invention relates to an edible article having a temperature below -3°C, in particular below -10°C and in general preferably below -15°C, at least part of which is transparent. The edible articles of the invention are frozen confections comprising a transparent non-crystalline part.

It is known that tap water and aqueous solutions liberate dissolved gas on freezing, the liberated gas being one cause of opacity of ice cubes and frozen confections. Water ices and similar frozen novelties are mainly opaque due to differences in the refractive index of ice crystals and of the matrix of frozen sugar solution.

There is a continuing need for novel products in the area of frozen confections and an object of the invention is to provide an edible article such as an ice lolly, which is transparent at the temperatures as defined before.

The invention provides thereto an edible article having a temperature below -3°C, at least part of which is transparent, wherein the bulk of the transparent part is in a non-crystalline state. The storage and consumption temperatures generally are both below -10°C and often mostly below -15°C.

In practice several options are available for maintaining the non-crystalline state, one being arranging that the transparent part is in a glassy state at temperatures above -20°C and preferably above -10°C, being the usual lower limit for the consumption temperature and another arranging that the bulk of the transparent part is in a non-solidified state at temperatures down to -5°C or below, and preferably below the usual storage temperatures. The former option can be realised in practice by having an

adequate concentration of sufficiently low molecular weight solutes contained in that transparent part, the latter option by having sufficient solutes contained in that transparent part of depress the freezing point thereof to below the required temperature.

Particularly in case of using freezing point depressants the perceived sweetness of the non-frozen transparent part may be reduced if it comprises a gelling agent in an amount sufficient to effect gelation at temperatures below -15°C and preferably below the usual storage temperatures, generally about -20°C. A preferred gelling agent for this purpose is gelatin and in particular one of a bloom strength between 150 and 300. A suitable concentration being from about 1% to about 5% by weight, usually about 4%.

To prevent the non-solidified part from deforming and sticking to packaging material and to the fingers of the consumer preferably at least the free surface of that part is coated with a thin layer of transparent frozen water, which may contain small amounts of dissolved matter, provided the transparency is not injured. The expression "thin" in this context is meant to exclude thicknesses which are subject to becoming opaque and generally means up to 4 mm. A thickness of 1 mm already suitably performs the protective purpose and generally a thickness of the outer layer up to 4 mm will not give rise to any cracking, turbidity or other causes for opaqueness although for organoleptic reasons a thickness up to 2½ mm is preferred.

The invention is of particular value for products intended to be hand held with the aid of a stick positioned within the product.

Having generally described the invention various aspects and preferred embodiments will be described in detail with respect to the drawings wherein

Figure 1 shows a perspective view of an ice lolly according to one embodiment of the invention,

Figure 2 is a longitudinal section along the line II-II in Figure 1 and

Figure 3 is a longitudinal section of another embodiment of the invention.

In the drawings Figures 1 and 2 are schematically showing an ice lolly, comprising an edible paddle part 1 on a usual wooden stick 2. The edible part thereof comprises a transparent part 3 at the tip remote from the stick. An opaque part 4 of usual water ice mix is arranged at the stick end of the paddle part 1.

A transparent outer coating 5 is enclosing the outer surface of both the transparent and the opaque part, except for the side facing the stick 2.

Figure 3 shows a longitudinal section similar to the one of Figure 2, comprising a transparent part 7 entirely enclosed by opaque frozen confection material 8 except for the opposite sides lying flush with the large opposite sides of the edible portion. A usual wooden stick 9 is inserted and adhered in the opaque material 8.

In the following examples preferred recipes and methods will be described for manufacturing the products as shown in the drawings.

Example 1

A usual metal mould for manufacturing ice lollies was filled with distilled de-aerated water containing 0.4% citric acid and 0.1% aspartame. The mould was inserted in a brine bath kept at -30°C. After 40 seconds the liquid was sucked out of the mould, leaving a thin film 5 of ice of about 1 mm thickness on the inside of the mould. Because of the thinness of this layer pure water without any additions can be used as well as such a thin layer is almost unperceivable.

To form the transparent region 3 the ice coated mould was filled to of the usual level with a clear solution of the following composition:

A:	sucrose	69.5%
	gelatin	4%
	lemon flavour	0.1%
	citric acid	0.4%
	water	26%

A conventional wooden stick 2 is inserted halfway into the mould and a water ice mix of the following composition B is poured into the mould up to the usual filling level:

B:	sucrose	16%
	40 SE corn solids	4%
	CMC	0.4%
	citric acid	0.6%
	lemon flavour	0.045%
	water	up to 100%

After the contents have entirely been solidified the mould is removed from the refrigerant brine and briefly sprayed with hot water for thawing up a thin superficial film of material whereafter the frozen article 1 can be removed

from the mould. The article as shown in Figures 1 and 2 is now ready for eating but can also be stored and distributed at usual deep freeze temperatures.

Example 2

The article as shown in figure 3 can be made as follows: An aqueous solution is prepared having composition A of Example 1 and frozen to a disc 7 having a diameter of 3½ cm and a thickness of 2 cm while being exposed to ultrasonic vibrations. This disc 7 is put in a metal ice lolly mould which is tapering from 2.2 cm to a narrow rounded bottom.

The mould is kept at ambient temperature and consequently the disc slowly melts at the places where it is in contact with the mould, thereby conforming to the shape of the mould and sliding towards the bottom.

As soon as the opposite faces of the disc are entirely in contact with the mould the latter is inserted in a brine bath kept at -25°C and filled to the usual filling level with a water ice mix of composition B of Example 1 to form the opaque portion 8. Thereafter a usual wooden stick 9 is inserted.

After entirely freezing the contents the mould is briefly warmed up to thaw a thin film and to remove the frozen article from the mould. The resulting article is opaque with a round transparent look through portion.

Example 3

A product is manufactured with the following formulation:

sucrose	60%
glucose	20%
water	20%.

In addition usual small quantities of colour and flavour may be added. The sucrose and glucose are added to the water which is then heated and stirred. The solution is boiled until sufficient water has evaporated that the boiling temperature is 150°C. The solution is poured into a cold mould. The solidified article may then be incorporated as part of an ice lolly. It will remain transparent because it is in the glassy state and no ice will form at any temperature.

Example 4

63 DE corn syrup is heated in a microwave oven to evaporate water until it is boiling at 120°C. It is then removed from the oven, cooled, and used for making ice lollies or portions thereof after addition of lemon flavour. At this low moisture content it will be glassy at sub-zero temperatures so that no ice will form and therefore it is transparent. Above 0°C it transforms to a rubbery solid and therefore can be eaten.

It does not need explanation that various embodiments can be thought of: different shapes, different compositions, inserts in the transparent portion to be clearly seen and inserts attached to the inward end of the stick.

Parts and percentages in this specification and claims relate to weights unless otherwise indicated.

CLAIMS

1. Edible article having a temperature below -3°C, at least part of which is transparent, characterised in that the bulk of the transparent part is in a non-crystalline state.

2. Article according to claim 1, characterised in that the bulk of the transparent part is in a glassy state at temperatures above -20°C and preferably above -10°C.

3. Article according to claim 1, characterised in that the bulk of the transparent part is in a non-solidified state at temperatures down to -5°C or below.

4. Article according to claim 3, characterised in that the bulk of the transparent part comprises a gelling agent in an amount sufficient to effect gelation at temperatures below -15°C.

5. Article according to claim 3 or 4, characterised in that the outer surface of the transparent part is coated with a transparent layer predominantly consisting of frozen water.

6. Article according to claim 1-5, characterised in that at least the free surface of the transparent part is coated with a thin outer layer of transparent frozen water containing an amount of solutes not injuring the transparency thereof.

7. Article according to claim 6, characterised in that the outer layer has a thickness generally up to 4 mm and in particular ranging between 1 and 2½ mm.

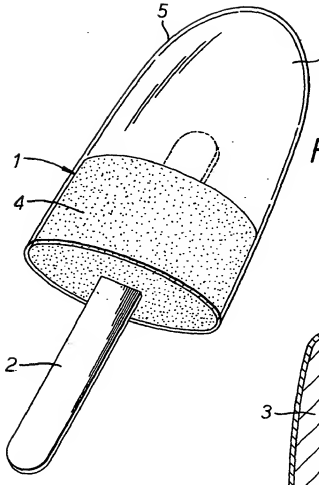

Fig. 1.

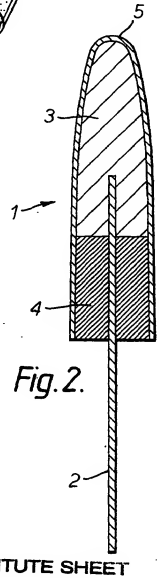

Fig. 2.

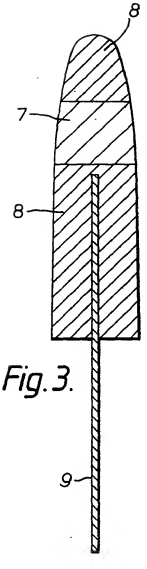

Fig. 3.

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 93/00838

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 A23G9/02

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	A23G

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No.[13]
X	PATENT ABSTRACTS OF JAPAN vol. 16, no. 148 (C-928)13 April 1992 & JP,A,40 04 846 (LOTTE)	1-3
Y	see abstract	5
Y	US,A,4 832 976 (GENERAL FOODS CORP.) 23 May 1989 see column 3, line 59 - line 62	5
X	CENTRAL PATENTS INDEX, BASIC ABSTRACTS JOURNAL Derwent Publications Ltd., London, GB; AN 79-26865B & JP,A,54 026 363 (LOTTE) see abstract	1-4

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
28 JULY 1993	18. 08. 93
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	GUYON R.H.

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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US,A,2 550 656 (SWIFT &COMP.) 24 April 1951 see claim 1	1
X	DE,A,1 692 383 (W. RAU) 29 July 1971 see the whole document	1,4
A	EP,A,0 322 469 (J. NADLER) 5 July 1989 see column 4, line 27 - line 29	1,5-7
A	WO,A,9 011 481 (J. HOBELSBERGER) 4 October 1990 see the whole document	1,5-7
A	DE,U,9 112 890 (R. DÖRING) 19 December 1991 see the whole document	1
A	PATENT ABSTRACTS OF JAPAN vol. 6, no. 261 (C-141)21 December 1982 & JP,A,57 155 953 (ROKUTA SATORU) see abstract	1,5-7

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

GB 9300838
SA 73135

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
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US-A-2550656		None	
DE-A-1692383	29-07-71	None	
EP-A-0322469	05-07-89	AU-A- 2679288 JP-A- 1202258	29-06-89 15-08-89
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DE-U-9112890	19-12-91	None	